~~c) and, to adapt said dictionary to a use with at least one given resolution, a second, definitive, dictionary is constructed, on the basis of the intermediate dictionary, by embedding/simplification of dictionaries of increasing/decreasing resolutions, the dictionaries of increasing resolutions being inter-embedded from the dictionary of smallest resolution up to the dictionary of greatest resolution~~ according to claim 4.

Claim 31 (previously presented): A computer readable memory storing a computer program product intended to be stored in a memory of a processing unit, in particular of a computer or of a mobile terminal integrating ~~a~~ at least one of coding and / decoding device, or on a removable memory medium and intended to cooperate with a reader of the processing unit, wherein it comprises instructions for implementing the method ~~a use of a dictionary in the compression coding/decoding of digital signals, by vector quantization at variable rate defining a variable resolution,~~

~~said dictionary, of a given dimension, giving codevectors reconstituted by using at least one correspondence table making it possible to reconstitute any codevector of the dictionary of said given dimension, using indices of a collection of insertion/deletion rules and indices identifying elements of a set of codevectors that may not be obtained by application of the insertion/deletion to codevectors of lower/higher dimension than the given dimension according to said collection of insertion/deletion rules,~~

~~in which a search is made for the codevector (x^j) which is the nearest neighbour of an input vector $y=(y_0, \ldots, y_k, \ldots, y_{j-1})$ in a dictionary (D^i_j) of given dimension (j),~~

~~and comprising the following steps:~~

~~CO1) for a current index (m^j) of said codevector (x^j) sought, reconstitution at least partial of a codevector of index (m') corresponding to said current index (m^j), at least through the prior reading of the indices (j', m', l_r) appearing in the correspondence tables making it possible to formulate said dictionary,~~

~~CO2) at least on coding, calculation of a distance between the input vector and the codevector reconstituted in step CO1),~~

~~CO3) at least on coding, repetition of steps CO1) and CO2), for all the current indices in said dictionary,~~

~~CO4) at least on coding, identification of the index (m_{min}) of the codevector at least partially reconstituted whose distance (d_{min}), calculated in the course of one of the iterations of step CO2), with the input vector is the smallest, and~~

~~CO5) at least on decoding, determination of the nearest neighbour of the input vector (y) in the guise of codevector (x^i) whose index (m_{min}) has been identified in step CO4)~~ according to claim 25.

Claim 32 (new): The method as claimed in claim 13, in which:

- a first set and a first collection of editing operation rules are chosen a priori by analysis of a learning sequence, so as to form one or more intermediate dictionaries,
- at least one part of said first set and/or of said first collection of editing operation rules is updated by a posteriori analysis of said one or more intermediate dictionaries,
- and, as appropriate, at least one part of the set of codevectors forming said one or more intermediate dictionaries is also updated.

Remarks

The following remarks are responsive to the Office Action of May 12, 2008.

At the time of the Office Action, claims 1-31 were pending.

- Claims 1-3, 8-11, 25-27, 29 and 31were rejected under 35 U.S.C. §103(a) as obvious over Gersho et al. (U.S. Patent No. 5,890,110, hereinafter "Gersho").
- Claims 4-5, 18-20, 22-24 and 30 were rejected under 35 U.S.C. §103(a) as obvious over Gersho et al. in view of Chan et al ("Constrained-Storage Vector Quantization in High Fidelity Audio Transform Coding", hereinafter "Chan").
- Claim 12 was rejected under 35 U.S.C. §103(a) as obvious over Gersho et al. in view of Chan et al., and further in view of Nishiguchi et al. (U.S. Patent No. 5,765,127, hereinafter "Nishiguchi").
- Claims 13-14 were rejected under 35 U.S.C. §103(a) as obvious over Gersho et al. in view of Chan et al., and further in view of Bahl et al. (U.S. Patent No. 5,182,773, hereinafter "Bahl").
- Claim 28 was rejected under 35 U.S.C. §103(a) as obvious over Gersho et al. in view of Kolesnik et al. (U.S. Patent No. 5,832,443, hereinafter "Kolesnik").
- Claims 1-3 were also rejected under 35 U.S.C. §101 as directed to a non-statutory subject matter.
- Claims 5-7 and 11 were rejected under 35 U.S.C. §112, second paragraph.
- Claims 1, 4-8, 11, 13-17, and 20-31 were objected to.
- Claims 6, 15-17 and 21 have been indicated as allowable.

Objection to Claims 1, 4-8, 11, 13-17, and 20-31

Claims 1 and 22 are objected to for informalities. Claims 1 and 22 have been amended to make necessary corrections.

Claims 23 is objected to for informalities. Claim 23 has been amended to make necessary corrections.

Claims 4, 8, 11, 13-14, 20, 22-31 are objected to for using shorthand. Claims 4, 8, 11, 13-14, 20, 22-31 have been amended to make necessary corrections.

Claim 6 is objected to for errors. Claim 6 has been amended to make necessary corrections.

Claims 5-6 are objected to for failing to define the term "i." Claims 5-6 have been amended to make necessary corrections.

Claim 7 is objected to for two different "n" values. Claim 7 has been amended to make necessary corrections.

Claim 11 is objected to for having a misspelling. Claim 11 has been amended to make necessary corrections.

Allowable Subject Matter

Claims 6, 15, 16, 17, and 21 have been indicated as having allowable subject matter but are objected to for dependent upon rejected claim 4. Claims 6 and 15 have been amended to independent form having the limitations of claim 4.

35 U.S.C. §112 Rejections of Claims 5-7

Claims 5-7 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 7 is also rejected under 35 U.S.C. §112, second paragraph, as lacking antecedent basis. Claims 5-7 have been amended to make necessary corrections.

35 U.S.C. §112 Rejections of Claims 11

Claim 11 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner contends that the claim cites that the source is modeled by a "learning sequence," and it is not completely understood what is meant by a learning sequence and it is not described within the specification. Applicants respectfully traverse.

A learning sequence is known to one of ordinary skill in the art to be one way of performing statistical analysis. In Applicants' Specification para. [0236], *et seq.*, examples of statistical analysis and learning sequences are provided. Furthermore, in Applicants' Specification para. [0255], definition of learning sequences is provided. Therefore, Applicants respectfully submit that the element "learning sequence" is not indefinite. Withdrawal of the rejection is respectfully requested.

35 U.S.C. §101 Rejections of Claims 1-3, 25-29, and 30-31

Claims 1-3, 25-29, and 30-31 are rejected under 35 U.S.C. §101, as being directed to non-statutory subject matter. Claims 1-3, 25-29, and 30-31 have been amended to make necessary corrections.

35 U.S.C. §103(a) Rejections of Claim 1-5, 8-12, 18-20, 22-24, 25-31

Claim 4-5, 18-20, 22-24, and 30 are rejected under 35 U.S.C. §103(a), as being unpatentable over Gersho in view of Chan. In addition, claim 12 is rejected under 35 U.S.C. §103(a), as being unpatentable over Gersho in view of Chan and further in view of Nishiguchi. Furthermore, claim 28 is rejected under 35 U.S.C. §103(a), as being unpatentable over Gersho in view of Kolesnik. Applicants respectfully traverse.

Gersho fails to disclose the claim limitation of a dictionary that comprises inter-embedded dictionaries of increasing resolutions, since Gersho's method uses one single dictionary and sub-samples the vectors of this dictionary for coding the input vectors.

Gersho fails to disclose the claim limitation of a dictionary comprising a first set consisting of code vectors constructed by inserting into code vectors of dictionaries of a lower dimension, elements taken from a finite set of real numbers, since Gersho's method the code vectors of the unique codebook are merely sub-sampled. Gersho does not teach inserting elements taken from a finite set of real numbers.

Gersho's disclosure relates to a method for quantizing a variable dimension vector. The method disclosed by Gersho uses one **single** codebook. See Gersho, Abstract.

The codebook consists in a set of code vectors of a given dimension. See Gersho, col. 8, lines 19-21.

When an input vector is to be encoded, it is processed through a sub-sampling function G. See Gersho, col. 6, lines 32-33. This process creates an observable output vector S, which comprises a given number of components of the input vector. See Gersho, col. 1, lines 50-60. In order to select the components of the input vector which will compose the observable output vector S, random binary selector vector Q is generated with the same dimension as the codebook vectors. The components of the selector vector which are set to "1" give the position of the components in the input vector which will be used for defining the observable output vector S. See Gersho, col. 7.

This sub-sampling process is intended to convert the input variable dimension vector, to a fixed dimension vector. See Gersho, col. 6, lines 35-36.

Then, once selector vector Q is generated, the code vectors of the codebook are also sub-sampled according to the selector vector Q. See Gersho, col. 7, lines 5-8. The sub-sampling process of the code vectors of the codebook results in a new codebook with code vectors having a same dimension as the observable output vectors S. See Gersho, col. 8, lines 19-36.

Then, the nearest neighbor code vector of the new codebook is selected for coding the input vector. See Gersho, col. 8, lines 35-36.

Hence, as noted above, Gersho fails to disclose a dictionary that comprises inter-embedded dictionaries of increasing resolutions--Gersho's method uses one single dictionary and sub-samples the vectors of this dictionary for coding the input vectors.

Gersho further fails, as noted above, to disclose a dictionary comprising a first set consisting of code vectors constructed by inserting into code vectors of dictionaries of a lower dimension, elements taken from a finite set of real numbers. Indeed, in Gersho's method the code vectors of the unique codebook are merely sub-sampled. Gersho does not teach inserting elements taken from a finite set of real numbers.

As Gersho discloses a codebook of code vectors of a fixed dimension and sub-sampling these code vectors for adapting them to a size of an observable output vector which has been sub-sampled to the same dimension as the vectors of the codebook, one of ordinary skill in the art would not find Gersho to be relevant to the present invention.

Thus, Applicants respectfully submit that the subject matter of claims 1-3 is new and non-obvious over Gersho's disclosure.

Applicants further submit that the subject matter of claim 4 is new and non-obvious over Gersho's disclosure. Moreover, Applicants respectfully submit that the subject matter of claim 4 is new and nonobvious over Chan's disclosure ("Constrained-Storage Vector Quantization High Fidelity Audio Transform Coding").

Chan discloses a method for quantizing large dimension input vectors. Chan proposes to partition the bits of the input vector and to separately code the partitions of the input vector. For that purpose, Chan proposes to use several codebooks for each partition (see Chan, p. 3598, left hand column, second paragraph). In the case where two partitions of the input vector have similarities, Chan proposes to use a same codebook for these two similar partitions. Furthermore, in case of a variable rate coding, Chan proposes to use an embedded **or** multi-resolution codebook (see Chan, p. 3598, left hand column, fifth paragraph).

Even disclosing an embedded or multi-resolution codebook, Chan fails to disclose an embedded dictionary from the dictionary of smallest resolution up to dictionary of greatest resolution. Moreover, Chan does not disclose the combination of an embedded and multi-resolution codebook.

In the Office Action, the Examiner contends that the disclosures of Gersho and Chan belong to the same technical field. However, Gersho teaches to use a unique codebook and then sub-sampling the code vectors of this codebook while Chan teaches using several codebooks. Thus, a person with ordinary skills in the corresponding art, starting from the disclosure of Gersho, would not have considered Chan's disclosure. Indeed, Gersho adapts the code vectors by sub-sampling them. Nothing in Gersho or Chan suggests using several dictionaries of code vectors.

Hence, Applicants respectfully submit that the subject matter of claim 4, and the subject matter of dependent claims 5-24, is new and non-obvious over the teachings of Chan's or Gersho's disclosures and their combination.

As far as amended claims 25-31 are concerned, Applicants respectfully submis that they are allowable at least for the same reasons as those given above.

Dependent claims 12 and 28 were rejected over the combination of Gersho and Chan with Nishiguchi and Kolesnik respectively.

Claims 4-5, 18-20, 22-24, and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gersho in view of Chan. In addition, claim 12 is rejected under 35 U.S.C.

§103(a) as being unpatentable over Gersho in view of Chan and further in view of Nishiguchi. Furthermore, claim 28 is rejected under 35 U.S.C. §103(a), as being unpatentable over Gersho in view of Kolesnik. Claims 13 and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gersho in view of Chan and Bahl.

Without addressing the specifics of the additional references on the merits, Applicants rely upon the above arguments and asserts that the disclosures of each of these additional references, alone or in combination, does not serve to solve the deficiencies of the combination of Gersho and Chan. The Examiner has cited these references for purposes related to the specifics of the dependent claims.

For these reasons, the Applicants assert that the claim language clearly distinguishes over the prior art, and respectfully request that the Examiner withdraw the §103 rejection from the present application.

Conslusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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